Curriculum Vitae

Andrew T. Phillips

4 Landings Court
Annapolis, MD 21403
(410) 280-0062

United States Naval Academy
Computer Science Department
572 Holloway Road
Annapolis, MD 21402-5002
(410) 293-6813

Position

Associate Professor, Computer Science Department Division of Mathematics and Science, United States Naval Academy	1993-present
Visiting Associate Professor, Department of Pharmaceutical Chemistry College of Pharmacy, University of California, San Francisco	1996
Assistant Professor, Computer Science Department Division of Mathematics and Science, United States Naval Academy	1988-1993

Academic Degrees

Ph.D., Computer Science University of Minnesota (UM)	1988
M.S., Computer Science University of Minnesota	1986
B.S., Mathematics/Computer Science The Pennsylvania State University (PSU)	1984

Honors (since 1984)

San Diego Supercomputer Center Senior Fellow	1995-present
Minnesota Supercomputer Institute Research Fellow	1991-1994
Army High Performance Computing Research Center Senior Fellow	1991-1992
NSF "Parallel Computing in the Undergraduate Curriculum" Member	1993
Computer Science Department Outstanding Teacher Award	1990, 1992, 1994, 1995
Computer Science Department Outstanding Researcher Award	1994
United States Naval Academy Faculty Performance Award	1990, 1991
General Electric Foundation Graduate Fellowship	1987-1988
Office of Naval Research (ONR) Graduate Fellowship	1984-1987
NSF Supercomputer Summer Institute Member	1985
Honors Degree with Highest Distinction (PSU)	1984

Research Grants

NSF ROA Award #BIR-9119575 (1995-96): Molecular Structure Prediction by Global Optimization.
Minnesota Supercomputer Institute Research Fellow Grant (1991-1994).
Army High Performance Computing Research Center Senior Fellow Grant (1991-1992).
NSF Grant #ASC-8902036 (1989-91): Parallel Algorithms for Constrained Nonlinear Global Optimization.
AFOSR Grant #AFOSR-MIPR-89-0031 (1989-90): Parallel Algorithms for Constrained Nonlinear Global Optimization.

Research Interests

Mathematical Programming and Combinatorial Optimization
Parallel and Distributed Computing
Computational Biology, DNA Computing
High Performance Computer Architecture
Computer Security
Large-Scale Scientific Computing and Supercomputing
Numerical Methods and Mathematical Software

Publications

Books

Topics in Parallel Computing in Mathematical Programming (with P.M. Pardalos and J.B. Rosen). *Science Press*, D.Z. Du (Editor). 1992.

Refereed Publications

Protein Structure Prediction and Potential Energy Landscape Analysis using Continuous Global Minimization (with K.A. Dill and J.B. Rosen). *Proceedings of the First Annual International Conference on Computational Molecular Biology*, 109-117, 1997.

Molecular structure prediction by global optimization (with K.A. Dill and J.B. Rosen). *Developments in Global Optimization*, 217-234, I.M. Bomze et al. (Eds), 1997.

CGU: An algorithm for molecular structure prediction (with K.A. Dill and J.B. Rosen). *IMA Volumes in Mathematics and its Applications: Large Scale Optimization with Applications, Part III: Molecular Structure and Optimization*, 1-22, L.T. Biegler et al. (Eds), 1997.

Molecular structure determination by convex global underestimation of local energy minima (with J.B. Rosen and V.H. Walke). *Dimacs Series in Discrete Mathematics and Theoretical Computer Science* 23:181-198, 1995.

A quadratic assignment formulation of the molecular conformation problem (with J.B. Rosen). *Journal of Global Optimization* 4:229-241, 1994.

A computational comparison of two methods for constrained global optimization (with J.B. Rosen and M. van Vliet). *Journal of Global Optimization* 5:325-332, 1994.

Sufficient conditions for solving linearly constrained separable concave global minimization problems (with J.B. Rosen). *Journal of Global Optimization* 3:79-94, 1993.

A parallel stochastic method for solving linearly constrained concave global minimization problems (with J.B. Rosen and M. van Vliet). *Journal of Global Optimization* 2:243-258, 1992.

Efficient computation of extreme points of convex hulls in **R**d1 (with J.B. Rosen and G.-L. Xue). *Advances in Optimization and Parallel Computing*, P.M. Pardalos (Editor). Elsevier Science Publishers B.V., pp. 267-292, 1992.

Global optimization of quadratic fractional programs (with P.M. Pardalos). *Journal of Global Optimization* 1(2):173-182, 1991.

A parallel algorithm for partially separable non-convex global minimization: Linear Constraints (with J.B. Rosen). *Annals of Operations Research* 25:101-118, 1990.

Guaranteed e-approximate solution for indefinite quadratic global minimization (with J.B. Rosen). *Naval Research Logistics* 37:499-514, 1990.

A global optimization approach for solving the maximum clique problem (with P.M. Pardalos). *International Journal of Computer Mathematics* 33:209-216, 1990.

Anomalous acceleration in parallel multiple-cost-row linear programming (with J.B. Rosen). *ORSA Journal on Computing* 1(4):247-251, 1989.

A parallel algorithm for constrained concave quadratic global minimization (with J.B. Rosen). *Mathematical Programming* 42:421-448, 1988.

A parallel algorithm for solving the linear complementarity problem (with J.B. Rosen). Special Volume on Parallel Optimization on Novel Computer Architectures. *Annals of Operations Research* 14:77-104, 1988.

<u>Proceedings / Technical reports</u>

Sufficient conditions for linearly constrained concave global minimization: Computational implementation (with J.B. Rosen). Army High Performance Computing Research Center Preprint 91-66. University of Minnesota, Minneapolis, MN, August 1991.

A separable quadratic global minimization formulation of the linear complementarity problem. Computer Science Department Report. United States Naval Academy, Annapolis, MD, November 1989.

Finding the extreme points of a convex hull in parallel (with J.B. Rosen). Computer Science Department Report. United States Naval Academy, Annapolis, MD, May 1989.

A characterization of the global minimizer of a linearly constrained indefinite quadratic minimization problem. Computer Science Department Report. United States Naval Academy, Annapolis, MD, January 1989.

Fast approximate solution of large-scale constrained global optimization problems (with E.L. Stuart and J.B. Rosen). Computer Science Department Preprint 88-9. University of Minnesota, Minneapolis, MN, January 1988.

A parallel algorithm for constrained concave quadratic global minimization: Computational aspects (with J.B. Rosen). University of Minnesota Supercomputer Institute Preprint UMSI 87/101. University of Minnesota, Minneapolis, MN, December 1987.

Multitasking solution of mathematical programming problems (with J.B. Rosen). *Science and Engineering on Cray Supercomputers: Proceedings of the Third International Symposium*, Minneapolis, Minnesota, September 1987.

Invited Lectures (last 10 years)

Protein Structure and Energy Landscape Dependence on Sequence using a Continuous Energy Function. The San Diego Supercomputer Center, San Diego, CA (February 1997).

Protein Structure and Energy Landscape Dependence on Sequence using a Continuous Energy Function. Department of Molecular Biology, The Scripps Research Institute, La Jolla, CA (February 1997).

Protein Structure Prediction and Potential Energy Landscape Analysis using Continuous Global Minimization. RECOMB97, Santa Fe, NM (January 1997).

Protein Structure Prediction using Continuous Global Minimization. INFORMS, Atlanta, GA (October 1996).

Molecular Structure Prediction by Global Optimization. Department of Pharmaceutical Chemistry Colloquium Series, University of California at San Francisco, San Francisco, CA (February 1996).

CGU: A Global Optimization Algorithm for Protein Structure Prediction. Global Optimization III, Szeged, Hungary (December 1995).

Molecular Structure Prediction by Global Optimization. Department of Computer Science and Engineering Parallel Computing Colloquium Series, University of California at San Diego, San Diego, CA (October 1995).

Molecular Structure Determination by Convex Global Underestimation of Local Energy Minima. Department of Mathematics Numerical Analysis Colloquium Series, University of California at San Diego, San Diego, CA (October 1995).

New Computational Results for the Global Minimization of Indefinite Functions. State of the

Art in Global Optimization: Computational Methods and Applications, Princeton University, Princeton, NJ (April 1995).

A Global Optimization Approach for the Molecular Conformation Problem. The Institute for Discrete Mathematics and Theoretical Computer Science (DIMACS), New Brunswick, NJ (March 1995).

An Optimization Approach to the Molecular Conformation Problem. ORSA/TIMS Joint National Meeting, Boston, MA (April 1994).

Protein Folding by Discrete Global Minimization. ORSA/TIMS Joint National Meeting, Phoenix, AZ (October 1993).

Protein Folding by Global Minimization on the CM-5. ORSA/TIMS Joint National Meeting, Chicago, IL (April 1993).

Pipeline Control of High Performace Computers. Carleton College, Northfield, MN (February 1993).

Computational Comparison of Stochastic and Guaranteed Bound Methods for Constrained Global Optimization. SIAM Conference on Optimization, Chicago, IL (May 1992).

Computational Comparison of Two Methods for Constrained Global Optimization. ORSA/TIMS Joint National Meeting, Orlando, FL (May 1992).

Sufficient Conditions for Fast Solution of Linearly Constrained Concave Global Minimization Problems. Army High Performance Computing Research Center, Minneapolis, MN (July 1991).

A Parallel Stochastic Method for Solving Linearly Constrained Concave Global Optimization Problems. TIMS/ORSA Joint National Meeting, Nashville, TN (May 1991).

Sufficient Conditions for Fast Solution of Linearly Constrained Global Optimization Problems. Global Optimization II, Sopron, Hungary (December 1990).

Guaranteed ε*-Approximate Solution for Large-Scale Global Minimizing*. Washington State University, Pullman, WA (Oct 1989).

Guaranteed Approximate Solution for Large-Scale Global Minimizing. CORS/TIMS/ORSA Joint National Meeting, Vancouver B.C. (May 1989).

Guaranteed ε*-Approximate Global Minimum for Indefinite Quadratic Programs*. The Theory and Computational Aspects of Global Optimization, Department of Decision and Information Sciences workshop, University of Florida, Gainesville, FL (March 1988).

Global Minimization of Linearly Constrained Concave and Indefinite Quadratic Functions. ORSA/TIMS Joint National Meeting, St. Louis, MO (October 1987).

Multitasking Solution of Mathematical Programming Problems. Third International Symposium on Science and Engineering on Cray Supercomputers, Minneapolis, MN (September 1987).

Solution of Constrained Global Optimization by Parallel Computing. Symposium on Parallel Optimization, Madison, WI (August 1987).

Parallel Computing and Combinatorial Optimization. ORSA/TIMS Joint National Meeting, New Orleans, LA (May 1987).

Multitasking Algorithms for Constrained Optimization. Argonne National Laboratory, Chicago, IL (October 1986).

Multiprocessor Algorithms for Global Optimization. ORSA/TIMS Joint National Meeting, Los Angeles, CA (April 1986).